

**Exhibit 4****Spruce Mountain Wind Project  
July 15, 2010 Resubmission Peer Review**

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Submitted by:

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Following the June 23, 2010 MDEP Noise Study Peer Review with subsequent applicant meeting on June 29, 2010 PATRIOT RENEWABLES Spruce Mountain Wind, LLC has proposed additional conservatism in the project design in correspondence dated July 15, 2010.

Modeling assumptions applied to the project comprised of 10 - G90 2.0-MW wind turbines:

- Omni-directional downwind propagation
- All wind turbines operating at maximum sound power levels concurrently
- Manufacturer specifications + 2dBA (IEC 61400-11)
- Current, warranted Gamesa G90 maximum sound power output 105.0 dBA (previously 105.3 dBA)
- Ground absorption factor of  $G = 0.5$
- Foliage effects (not included)
- Application of a 3dBA safety factor to closest protected location region
- Spherical divergence from hub level sources
- Atmospheric absorption (10° C 70% RH)
- Screening by topography and obstacles (3 dimensional analysis)

Safety factors added to all WTs demonstrates MDEP/Town of Woodstock compliance. Compliance utilizing a 5 dBA safety factor requires manufacturer controlled noise restricted operation for turbines 6-11, which are near a single closest protected location region.

Noise restricted operations are employed only during nighttime hours as depicted in Table 1 to comply with MDEP/Town of Woodstock regulations.

**Table 1 Proposed Noise Restricted Operations Schedule**

Turbine #	Nighttime Hours (7:00 pm – 10:00 pm) <sup>1</sup>	Nighttime Hours (10:00 pm – 7:00 am) <sup>2</sup>
6		2.8 dBA reduction
7		2.8 dBA reduction
8		1.8 dBA reduction
9	2.8 dBA reduction	2.8 dBA reduction
10	2.8 dBA reduction	2.8 dBA reduction
11	1.8 dBA reduction	1.8 dBA reduction

<sup>1</sup>MDEP -- nighttime noise standard of 45 dBA, within 500 feet from residential receptor (7:00 pm to 7:00 am)

<sup>2</sup>Town of Woodstock -- nighttime noise standard waiver at the Project property boundary allows for limits of 50 dBA at most of the boundary and 55 dBA in two select areas of the Project property boundary (10:00 pm to 7:00 am)

Roughness length statistical calculations incorporating the effect of localized windshear were completed by season, worst-case nighttime high windshear occurrence frequency and surface meteorological stability classification may be concluded only by inference.

SDRS are not expected to be common occurrences based on the literature and a memorandum from Kenneth Kaliski, PE, INCE board-certified.

Tetra Tech concludes that the original, January 14, 2010 proposed Spruce Mountain Wind Project was designed to operate in compliance with the Town of Woodstock Noise Performance Standards and the State of Maine DEP noise limits for wind power projects at all residential receptor locations.

Spruce Mountain Wind has been willing to take additional conservative measures per request of the MDEP.

Spruce Mountain Wind requests a post-construction sound monitoring plan that includes a provision to demonstrate compliance with some or all of turbines 6-11 set in the normal operating mode without reduced sound-power restrictions.

### **Conclusion - (Peer Review)**

In my opinion the July 15, 2010 Spruce Mountain Wind Project noise assessment is reasonable and technically correct according to standard engineering practices and the Department Regulations on Control of Noise (06-096 CMR 375.10).

The wind project prediction model is based on CADNA/A software, ISO-9613-2 algorithms and the following prediction assumptions:

- Omni-directional downwind propagation
- All wind turbines operating at maximum sound power levels concurrently
- Manufacturer specifications + 2dBA (IEC 61400-11)
- Current, warranted Gamesa G90 maximum sound power output 105.0 dBA (previously 105.3 dBA)
- Ground absorption factor of  $G = 0.5$
- Foliage effects (not included)
- Application of a 3dBA safety factor to nearby protected location region
- Spherical divergence from hub level point sources
- Atmospheric absorption (10° C 70% RH)

Incorporation of an uncertainty factor of + 5 dBA for maximum equipment specification potential variability under stable atmospheric conditions and measurement methodology uncertainties results in a reasonable prediction model that may be conservative at times.

I recommend required routine operation noise compliance assessment preferably during periods of hardwood defoliation (November 1-May 1) utilizing the following methodology based on very selective meteorological, background sound conditions and specific sound measurement parameters.

In the light of public concerns regarding unbiased compliance testing and post development potential noise complaints, the reviewer suggests post-construction routine operation noise compliance demonstration through third-party testing and periodic compliance confirmation (1-5 years).

Spruce Mountain Wind's request for a post-construction sound monitoring plan to demonstrate compliance with some or all of turbines 6-11 set in the normal operating mode without reduced sound-power restrictions should be allowed through a permit amendment following satisfactory demonstration of compliance as required by this review.

Compliance should be demonstrated, based on following outlined conditions for 12, 10-minute measurement intervals per monitoring location meeting 06-096 CMR 375.10 requirements.

Extraneous sounds could potentially or do complicate routine operation compliance assessment. If the applicant must adjust for such sounds, background ambient monitoring will be necessary. If background ambient monitoring is proposed, locations and times should be determined with concurrence from the MDEP.

- a. Compliance will be demonstrated when the required operating/test conditions have been met for twelve 10-minute measurement intervals at each monitoring location.
- b. Measurements will be obtained during weather conditions when wind turbine sound is most clearly noticeable, i.e. when the measurement location is downwind of the development and maximum surface wind speeds  $\leq 6$  mph with concurrent turbine hub-elevation wind speeds sufficient to generate the maximum continuous rated sound power from the five nearest wind turbines to the measurement location. [Note: These conditions occur during inversion periods usually between 11pm-5am.] Measurement intervals affected by increased biological activities, leaf rustling, traffic, high water flow or other extraneous ambient noise sources that affect the ability to demonstrate compliance will be excluded from reported data. The intent is to obtain 10-minute measurement intervals that entirely meet the specified criteria. A downwind location is defined as within  $45^\circ$  of the direction between a specific measurement location and the acoustic center of the five nearest wind turbines.
- c. Sensitive receiver sound monitoring locations should be positioned to most closely reflect the representative protected locations for purposes of demonstrating compliance with applicable sound level limits, subject to permission from the respective property owner(s). Selection of monitoring locations should require concurrence from MDEP.
- d. Meteorological measurements of wind speed and direction should be collected using anemometers at a 10-meter height above ground at the center of large unobstructed areas and generally correlated with sound level measurement locations. Results should be reported, based on 1-second integration intervals, and be reported synchronously with hub level and sound level measurements at 10 minute intervals. The wind speed average and maximum should be reported from surface stations. MDEP concurrence on meteorological site selection is required.
- e. Sound level parameters reported for each 10-minute measurement period, should include A-weighted equivalent sound level, 10/90% exceedance levels and ten 1-minute 1/3 octave band linear equivalent sound levels (dB). Short duration repetitive events should be characterized by event duration and amplitude. Event frequency is defined as the average event frequency  $\pm 1$ SD and amplitude is defined as the peak event amplitude minus the average minima sound levels immediately before and after the event, as measured at an interval of 50 ms or less, A-weighted and fast time response, i.e. 125 ms. For each 10-minute measurement period short duration repetitive sound events should be reported by percentage of 50 ms or less intervals for each observed amplitude integer above 4 dBA. Reported measurement results should be confirmed to be free of extraneous noise in the respective measurement intervals to the extent possible and in accordance with (b.).
- f. Compliance locations should be determined in consultation with the Department.

Compliance data collected in accordance with the assessment methods outlined above for representative locations selected in accordance with this protocol should be submitted to the Department for review and approval prior to the end of the first year of facility operation. Compliance data for each location should be gathered and submitted to the Department at the earliest possible opportunity after the commencement of operation, with consideration for the required weather, operations, and seasonal constraints.

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